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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/520,259	03/07/2000	Peter P. Van Bommel	94.0027	1286

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EXAMINER

GARCIA OTERO, EDUARDO

ART UNIT	PAPER NUMBER
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2123

4

DATE MAILED: 04/08/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/520,259	VAN BEMMEL, PETER P.	
	Examiner	Art Unit	
	Eduardo Garcia-Otero	2123	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07 March 2000 and 26 November 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-41 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-41 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 2) <input checked="" type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) <u>2</u> . | 6) <input type="checkbox"/> Other: |

DETAILED ACTION: Non-Final (first action on the merits)

Introduction

1. Title is: METHOD AND APPARATUS FOR MAPPING UNCERTAINTY AND GENERATING A MAP OR A CUBE BASED ON CONDITIONAL SIMULATION OF RANDOM VARIABLES.
2. First named inventor is: BEMMEL.
3. Claims 1-41 have been submitted, examined, and rejected.
4. This is the first action on the merits.

Index of Prior Art

5. **Jones** refers to US Patent 5,838,634.
6. **Matteucci** refers to US Patent 5,884,229.
7. **Tucker** refers to The Computer Science and Engineering Handbook, by Allen B. Tucker, CRC Press, ISBN: 0-8493-2909-4, 1996.
8. **Journel** refers to "Fundamentals of Geostatistics in Five Lessons" by Journel, vol 8 AGU, 1989 (mentioned at Specification page 1).
9. **Hogg** refers to Probability and Statistical Inference" by Hogg et al., Third Edition 1988, ISBN 0-02-355810-5, page 613 Table IV The Normal Distribution. Also see Section 6.4 Confidence Intervals for Means page 348-356.
10. **Webber** refers to US Patent 6,081,577.

Definitions

11. **McGraw-Hill Dictionary** refers to The McGraw-Hill Dictionary of Scientific and Technical Terms, Sixth Edition, by McGraw-Hill Companies, Inc., ISBN 0-07-042313-X, 2003.

Gaussian distribution-"normal distribution".

normal distribution-"A commonly occurring probability distribution that has the form... [equations] mean... variance. Also known as Gauss' error curve; Gaussian Distribution."

Priority-acknowledged

12. Acknowledgment is made of applicant's claim for priority to provisional application 60/135,904 filed 05/25/99.

Art Unit: 2123

Drawings-draftperson objection

13. This application has been filed with informal drawings which are acceptable for examination purposes only. Formal drawings will be required when the application is allowed. Specifically, see the enclosed Form 948, Notice of Draftperson's Drawing Patent Review which objects to the drawings.

Request for Information

14. The Examiner requests copies of the following publications because they appear to be especially germane to the claimed invention. In responding to this request, where the document is a bound text or a single article over 50 pages, the request may be met by providing copies of those pages that provide the relevant subject matter. See MPEP 704.14.
15. The Examiner requests: **"Fundamentals of Geostatics in Five Lessons"** by Journel, see Specification page 1, and requests **"GSLIB Geostatistical Software Library and User's Guide"** second edition" by Deutsch et al., see Specification page 1.

Claim Rejections - 35 USC § 103

16. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action: (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.
17. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:
1. Determining the scope and contents of the prior art.
 2. Ascertaining the differences between the prior art and the claims at issue.
 3. Resolving the level of ordinary skill in the pertinent art.
 4. Considering objective evidence present in the application indicating obviousness or nonobviousness.
18. **Claims 1-41 are rejected under 35 U.S.C. 103(a) as being unpatentable.**
19. **Claim 1 is rejected** under 35 U.S.C. 103(a) as being unpatentable over Jones in view of Matteucci and Tucker.
20. Claim 1 is an independent "method of generating a map... cross section" claim with 4 limitations.
21. (a)-**gridded cross section** is disclosed by Jones at Column 1 line 49 "three-dimensional array of individual model units or blocks (also called cells)". Note that a "cross section" is a subset

Art Unit: 2123

- of a three-dimensional array. Also see Jones Column 2 line 10 “structural surfaces or horizons in the form of 2-D computer grids or meshes”.
22. Jones does not explicitly disclose the remaining limitations.
23. (b)-**cumulative distribution function** is disclosed by Matteucci at Column 7 line 1 “cumulative distribution function”.
24. (c)-**choosing a value from each of the cumulative distribution function** is disclosed by Matteucci at Column 7 line 1 “cumulative distribution function”.
25. (d)-**assigning a unique color to said each value** is disclosed by Tucker at Plate 35.8. Said plate is in color, although the Applicant and the file will be provided only a black and white copy. The bar on the right labeled 0 to 12 displays a range of colors corresponding to different values, and the cutting plane at the center of the plate displays these colors. Each value has a unique color. Also see Tucker page 1520 “Preattentive processing is done for color... very useful if the rapid search for information is desired”.
26. **At the time** the invention was made, it would have been obvious to a person of ordinary skill in the art to use Matteucci and Tucker to modify Jones because cumulative distribution functions are the classic way to generate probabilities with confidence intervals, and because color coding of the information is useful for rapid searching by preattentive processing.
27. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Jones in view of Matteucci and Tucker and Journal.
28. Claim 2 depends from Claim 1, with three additional limitations.
29. Jones does not explicitly disclose the remaining limitations.
30. (b1)-**Kriging... expected values... standard deviations** is disclosed by Journal as discussed by Applicant at Specification Page 12 line 13 “The “Kriging” estimate is also known as the ‘expected value’”, and at Specification Page 12 line 17 “standard deviation”.
31. (b2)-**probability density function** is disclosed by Journal as discussed by Applicant at Specification Page 12 line 22 “Gaussian”. Note that Gaussian distribution means normal distribution, and that these distributions commonly occur in nature.
32. (b3)-**cumulative distribution function** is disclosed by Matteucci at Column 7 line 1 “cumulative distribution function”.

Art Unit: 2123

33. **At the time** the invention was made, it would have been obvious to a person of ordinary skill in the art to use Matteucci and Tucker and Journal to modify Jones because cumulative distribution functions are the classic way to generate probabilities with confidence intervals, and because color coding of the information is useful for rapid searching by preattentive processing. Further, one of ordinary skill in the art would use Kriging to generate Gaussian probability density functions because Kriging is the standard way of generating data for unknown cells based on known data from few cells, and would use Gaussian functions because they are well known and well behaved functions that are frequently found in stochastic systems.
34. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable Jones in view of Matteucci and Tucker and Journal and Hogg.
35. Claim 3 depends from Claim 2, with 1 additional limitation.
36. Jones does not explicitly disclose the remaining limitations.
37. (c1)-**choosing a probability “(1-Pcu)” from each of the cumulative distribution functions** is disclosed by Hogg at page 613 Table IV The Normal Distribution. Also see Section 6.4 Confidence Intervals for Means page 348-356.
38. **At the time** the invention was made, it would have been obvious to a person of ordinary skill in the art to use Matteucci and Tucker and Journal and Hogg to modify Jones because cumulative distribution functions are the classic way to generate probabilities with confidence intervals, and because color coding of the information is useful for rapid searching by preattentive processing. Further, one of ordinary skill in the art would use Kriging to generate Gaussian probability density functions because Kriging is the standard way of generating data for unknown cells based on known data from few cells, and would use Gaussian functions because they are well known and well behaved functions that are frequently found in stochastic systems.
39. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable Jones in view of Matteucci and Tucker and Journal and Hogg.
40. Claim 4 depends from Claim 2, with 1 additional limitation.
41. Jones does not explicitly disclose the remaining limitations.

Art Unit: 2123

42. (c1)-**choosing a cutoff “Xp” from each of the cumulative distribution functions** is disclosed by Hogg at page 613 Table IV The Normal Distribution. Also see Section 6.4 Confidence Intervals for Means page 348-356.
43. **At the time** the invention was made, it would have been obvious to a person of ordinary skill in the art to use Matteucci and Tucker and Journal and Hogg to modify Jones because cumulative distribution functions are the classic way to generate probabilities with confidence intervals, and because color coding of the information is useful for rapid searching by preattentive processing. Further, one of ordinary skill in the art would use Kriging to generate Gaussian probability density functions because Kriging is the standard way of generating data for unknown cells based on known data from few cells, and would use Gaussian functions because they are well known and well behaved functions that are frequently found in stochastic systems.
44. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable Jones in view of Matteucci and Tucker and Journal and Hogg.
45. Claim 5 depends from Claim 2, with 1 additional limitation.
46. Jones does not explicitly disclose the remaining limitations.
47. (c1)-**choosing a lower limit from each of the cumulative distribution functions** is disclosed by Hogg at page 613 Table IV The Normal Distribution. Also see Section 6.4 Confidence Intervals for Means page 348-356.
48. **At the time** the invention was made, it would have been obvious to a person of ordinary skill in the art to use Matteucci and Tucker and Journal and Hogg to modify Jones because cumulative distribution functions are the classic way to generate probabilities with confidence intervals, and because color coding of the information is useful for rapid searching by preattentive processing. Further, one of ordinary skill in the art would use Kriging to generate Gaussian probability density functions because Kriging is the standard way of generating data for unknown cells based on known data from few cells, and would use Gaussian functions because they are well known and well behaved functions that are frequently found in stochastic systems.
49. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable Jones in view of Matteucci and Tucker and Journal and Hogg.

Art Unit: 2123

50. Claim 6 depends from Claim 2, with 1 additional limitation.

51. Jones does not explicitly disclose the remaining limitations.

52. (c1)-**choosing a upper limit from each of the cumulative distribution functions** is disclosed by Hogg at page 613 Table IV The Normal Distribution. Also see Section 6.4 Confidence Intervals for Means page 348-356.

53. **At the time** the invention was made, it would have been obvious to a person of ordinary skill in the art to use Matteucci and Tucker and Journal and Hogg to modify Jones because cumulative distribution functions are the classic way to generate probabilities with confidence intervals, and because color coding of the information is useful for rapid searching by preattentive processing. Further, one of ordinary skill in the art would use Kriging to generate Gaussian probability density functions because Kriging is the standard way of generating data for unknown cells based on known data from few cells, and would use Gaussian functions because they are well known and well behaved functions that are frequently found in stochastic systems.

54. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable Jones in view of Matteucci and Tucker and Journal and Hogg.

55. Claim 7 depends from Claim 2, with 1 additional limitation.

56. Jones does not explicitly disclose the remaining limitations.

57. (c1)-**choosing a spread from each of the cumulative distribution functions** is disclosed by Hogg at page 613 Table IV The Normal Distribution. Also see Section 6.4 Confidence Intervals for Means page 348-356.

58. **At the time** the invention was made, it would have been obvious to a person of ordinary skill in the art to use Matteucci and Tucker and Journal and Hogg to modify Jones because cumulative distribution functions are the classic way to generate probabilities with confidence intervals, and because color coding of the information is useful for rapid searching by preattentive processing. Further, one of ordinary skill in the art would use Kriging to generate Gaussian probability density functions because Kriging is the standard way of generating data for unknown cells based on known data from few cells, and would use Gaussian functions because they are well known and well behaved functions that are frequently found in stochastic systems.

Art Unit: 2123

59. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable Jones in view of Matteucci and Tucker and Journal and Webber.
60. Claim 8 depends from Claim 2, with 1 additional limitation.
61. Jones does not explicitly disclose the remaining limitations.
62. (c1)-**affine correction** is disclosed by Webber at Column 21 line 29 “affine correction”.
63. **At the time** the invention was made, it would have been obvious to a person of ordinary skill in the art to use Matteucci and Tucker and Journal and Weber to modify Jones because cumulative distribution functions are the classic way to generate probabilities with confidence intervals, and because color coding of the information is useful for rapid searching by preattentive processing. Further, one of ordinary skill in the art would use Kriging to generate Gaussian probability density functions because Kriging is the standard way of generating data for unknown cells based on known data from few cells, and would use Gaussian functions because they are well known and well behaved functions that are frequently found in stochastic systems. Additionally, one of ordinary skill would use affine correction to “counteract” undesired effects according to Webber Column 21 line 16.
64. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable Jones in view of Matteucci and Tucker and Journal and Webber.
65. Claim 9 depends from Claim 8, with 1 additional limitation.
66. Jones does not explicitly disclose the remaining limitations.
67. **assigning said unique color to each said corrected value** is disclosed by Tucker at Plate 35.8. Said plate is in color, although the Applicant and the file will be provided only a black and white copy. The bar on the right labeled 0 to 12 displays a range of colors corresponding to different values, and the cutting plane at the center of the plate displays these colors. Each value has a unique color. Also see Tucker page 1520 “Preattentive processing is done for color... very useful if the rapid search for information is desired”.
68. **At the time** the invention was made, it would have been obvious to a person of ordinary skill in the art to use Matteucci and Tucker and Journal and Weber to modify Jones because cumulative distribution functions are the classic way to generate probabilities with confidence intervals, and because color coding of the information is useful for rapid searching by preattentive processing. Further, one of ordinary skill in the art would use

Art Unit: 2123

Kriging to generate Gaussian probability density functions because Kriging is the standard way of generating data for unknown cells based on known data from few cells, and would use Gaussian functions because they are well known and well behaved functions that are frequently found in stochastic systems. Additionally, one of ordinary skill would use affine correction to “counteract” undesired effects according to Webber Column 21 line 16.

69. Claims 10-14 are rejected under 35 U.S.C. 103(a) as being unpatentable
70. Claims 10-14 contain the same additional limitations as Claims 3-7, and therefore are rejected for the same reasons.
71. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Jones in view of Matteucci and Tucker.
72. Claim 15 is an independent “**program storage device... cross section**” claim, with the same limitations as “method... cross section” Claim 1.
73. Therefore Claim 15 is rejected for the same reasons as Claim 1.
74. Claims 16-24 are rejected under 35 U.S.C. 103(a) as being unpatentable
75. Claims 16-24 depend from “**program storage device... cross section**” Claim 15, and contain the same additional limitations as Claims 2-14, and therefore are rejected for the same reasons.
76. Claim 25 is rejected under 35 U.S.C. 103(a) as being unpatentable over Jones in view of Matteucci and Tucker.
77. Claim 25 is an independent “**apparatus... cross section**” claim, with the same limitations as “method... cross section” Claim 1.
78. Therefore Claim 15 is rejected for the same reasons as Claim 1.
79. Claims 26-29 are rejected under 35 U.S.C. 103(a) as being unpatentable
80. Claims 26-29 depend from “**apparatus... cross section**” Claim 25, and contain the same additional limitations as Claims 2-14, and therefore are rejected for the same reasons.
81. Claim 30 is rejected under 35 U.S.C. 103(a) as being unpatentable over Jones in view of Matteucci and Tucker.
82. Claim 30 is an independent “**method... cube**” claim, and is rejected for the same reasons as Claim 1 “method... cross section”. Note that the rejection used in Claim 1 applies to three dimensional cubes as well as two dimensional cross sections: is disclosed by Jones at

Art Unit: 2123

Column 1 line 49 “three-dimensional array of individual model units or blocks (also called cells)”. Note that a “cross section” is a subset of a three-dimensional array. Also see Jones Column 2 line 10 “structural surfaces or horizons in the form of 2-D computer grids or meshes”.

83. Claims 31-35 are rejected under 35 U.S.C. 103(a) as being unpatentable
84. Claims 31-35 depend from “**method... cube**” Claim 30, and contain the same additional limitations as Claims 2-14, and therefore are rejected for the same reasons.
85. Claim 36 is rejected under 35 U.S.C. 103(a) as being unpatentable over Jones in view of Matteucci and Tucker.
86. Claim 36 is an independent “**program storage device... cube**” with the same limitations as “method... cross section” Claim 1, and therefore is rejected for the same reasons. Again, note that the Jones prior art applies to both cubes and cross sections.
87. Claims 37-41 are rejected under 35 U.S.C. 103(a) as being unpatentable
88. Claims 37-41 depend from “**program storage device... cube**” Claim 36, with the same additional limitations as Claims 2-14, and therefore are rejected for the same reasons. Again, note that the Jones prior art applies to both cubes and cross sections.

Conclusion

89. All claims stand rejected against prior art.

Communication

90. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Eduardo Garcia-Otero whose telephone number is 703-305-0857. The examiner can normally be reached on Monday through Thursday from 9:00 AM to 7:00 PM.
91. If attempts to reach the Examiner by telephone are unsuccessful, the Examiner’s supervisor, Kevin Teska, can be reached at (703) 305-9704. The fax phone numbers for this group are:
92. (703) 746-7238 --- for communications after a Final Rejection has been made;
93. (703) 746-7239 --- for other official communications; and
94. (703) 746-7240 --- for non-official or draft communications.
95. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the group receptionist, whose telephone number is (703) 305-3900.

* * * *

Application/Control Number: 09/520,259

Page 11

Art Unit: 2123



KEVIN J. TESKA
SUPERVISORY
PATENT EXAMINER